Research Paper

Psychology in the Study of Physical Security*

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Considering the current global security environment the importance of good physical security is difficult to underestimate. And increasingly, physical security services are becoming a private rather than public service. According to the Bureau of Labor Statistics (2004), private security officers outnumber police officers by more than 2 to 1 in the United States. And increasingly, our society is relying on private firms to meet security needs. Recent reports suggest that this trend holds true for both daily security operations (Murphy, 1997) as well as times of crisis such as responding to terrorism (e.g. Virasami, 2005) or natural disasters (e.g. Higgins, 2005).

And while there is a large amount of research that has been conducted on policing, physical security has seen much less attention. The current state of research in the field of physical security could be described as fragmented or multidisciplinary, depending on your outlook. Physical security is primarily an applied field so, unlike areas like mathematics or physics, it has no dedicated line of research. Instead, the research that does exist is scattered through fields like engineering (both mechanical and electronic), computer science, chemistry and physics as well as social sciences such as criminology, sociology, and psychology. Multidisciplinary research can be healthy as it encourages new ideas and creative thinking, but too much fragmentation can be deleterious if physical security researchers are unable to find each other and share ideas. Exacerbating this fragmentation in the field of physical security is a lack of research outlets like peer-reviewed journals and academic conferences. Clearly there is a need for

outlets (such as this journal) where those active in the field of physical security can share ideas across specialty area. Which is what we hope to do with this article.

At its core, the act of providing security relies on two main elements, equipment or technology and people. And neither of these areas receives the attention and funding it deserves. But our experience suggests, although statistical proof was unavailable, that the lion's share of the funding that is available for research goes to equipment and technology. Some might say that such a distribution is merited because equipment is more important to security than people. Indeed, there seems to be a belief in the physical security world that there is some technological silver bullet that will solve security and eliminate the need for a human element at all. Others, however, would disagree. For example, General Eugene Habiger (ret.), former commander of U.S. strategic nuclear forces and security advisor to the U.S. Department of Energy has been quoted as saying "good security is 20% equipment and 80% people" (Bunn & Wier, 2004). While we suspect that both of these opposing views are partially right and partially wrong, the importance of the human element in good security should not be underestimated.

Consider this example drawn from one of the author's personal experiences. Not long ago this author lived in a condominium and apartment complex that had a contract with a private security firm to patrol the premises. There was a new puppy in the author's household and it happens that the firm's patrol schedule matched the puppy's schedule. As such, there were many occasions where the author was outside and had the opportunity to observe the duties preformed by the patrol officer. Essentially, it appeared that these duties simply involved driving to specified locations, jumping out of the patrol car and walking over to log the stop with a contact memory device attached to a fence,

and moving on to the next stop. This type of contact memory device scavenger hunt may be usefully in monitoring the movements of security officers, but it didn't make the complex more secure. These guards are so focused on getting to their pre-planned stops in a timely manner that security becomes less of a priority. Not once did those guards stop to ask how things were or if there was anything of concern they should know about. And their path to the corner of that fence and back into their patrol car was as predictable as the sunrise. In this case, the introduction of new equipment and technology (the contact memory device tracking system) actually hampered the job performance of the human elect (the security guards).

Of course we are not Luddites opposed to technology in any form, technology is a valuable asset in an overall security strategy. But we also believe that more attention needs to be spent trying to understand, and ultimately improve, the human elements of security. As such, the purpose of this paper is to point out lines of research into the human aspects of security that have not seen much attention but, in our opinion, deserve more. This is by no means a comprehensive list, and we could have included many other areas that we believe are fruitful. But rather than attempting the likely impossible task of developing a comprehensive list, we have focused on research in our areas of formal education (industrial/organizational psychology and social psychology for the first and second authors respectively) as well as those areas that might be especially influential or those that have been discussed frequently despite lacking much empirical research.

The Human Aspects of Physical Security

As we mentioned above, our rudimentary view of physical security breaks it down into two core elements. One the one hand there is equipment and technology and on the other is people. The people component of security might be further broken down into two subsets. The first subset contains issues and concerns that are purely human in nature and are associated with the impact that individuals, and groups of individuals such as organizations and societies, have on security. We will refer to this as the people component of security. The second subset contains issues and concerns associated with how humans interact with equipment and technology and how this interaction impacts security. We will call this the human factors of security. And while this division of the field of physical security is somewhat arbitrary, a comprehensive taxonomy of research in the field of physical security does not exist. In addition, the lines of research that we plan to discuss fall neatly into the two subsets above, so this division provides some structure for our discussion, to which we will now turn. What follows is a series of sections, each of which begins with a brief description of an issue in physical security and concludes with a discussion of theories and lines of research that could be brought to bear to help understand and address these issues.

The Human Factors Component of Physical Security

Increasingly, technology and advanced equipment are being utilized as a way to enhance security. However few, if any, security systems are completely automated. This means that at some point, the information collected by security equipment must be reviewed and acted upon by human security personnel. Consider the process of screening

baggage at the airport. Although x-ray machines may be helpful in speeding up the process, ultimately it is a person viewing images on a monitor that interprets the information the x-ray machines gather. In most cases, it is a human that makes key decisions about when to take action and what action to take. As such, it is the human component that must ultimately be deceived in order to breach security at such screening posts. And advances in technology including lower cost high quality video cameras, digital video recording and advanced imaging devises such as backscatter x-rays are making this type of setup very common outside of airports. More and more, the job of a security officer will be to watch a video screen for signs of trouble. Gaming security has relied heavily on security officers who specialize in video surveillance for some time and the proliferation of video cameras in recent years indicates that they are no longer alone.

However, prolonged monitoring of a video screen presents difficulties, which are often compounded by the fact that individuals usually monitor more than one screen at a time. Issues such as divided attention, prolonged attention, change blindness, visual fatigue and boredom all work to hinder performance in tasks such as these. Regrettably, we have seen little work on cognitive human performance issues such as these in the security research literature, although some research in this area has begun (Geraghty, 2003).

Fortunately cognitive performance questions like these have a long history in psychology. While many believe that the founder of psychology was Sigmund Freud, that honor actually belongs to a man named Wilhelm Wundt. In 1879, Wundt established the first known laboratory designed specifically for psychological research. It is worth mentioning this because Wundt's area of interest was sensation and perception, which is

an area ripe with theories that can be used to help explore many of the human performance issues in physical security.

Indeed, these theories have been applied to similar questions in the past. For example, since the early days of radar the military has been interested in how radar operators perform their job. To assist in understanding the process, researchers turned to signal detection theory (SDT). SDT (Proctor & Dutta, 1995) is essentially a way of determining an individual's ability to correctly distinguish a target signal (e.g. an enemy fighter) from background noise (e.g. birds, friendly planes, etc.). But the target in signal detection theory does not have to be an object, it could also be an event such as cheating at a gaming table. Regardless of what the target is, the use of SDT in experiments that systematically change aspects of the monitoring task (e.g. time on task, screens monitored, activity level around the participant) can help researchers to set up actual job conditions that support the desired level of vigilance among security officers. And since most of the work of security officers can be seen as monitoring tasks SDT could be applied to many other functions of security officers such as checking badges or authenticating the integrity of tamper-indicating seals.

The People Component of Physical Security

While it is difficult to asses the accuracy of Gen. Habiger's statement mentioned above, it would be equally difficult to argue that people are a wholly unimportant part of physical security. As such, it is worthwhile to pursue research aimed at understanding the role that people play in physical security. As was previously mentioned, however,

work in this area has been sparse. Nevertheless, there are a variety of issues in the field that could be successfully addressed through a better understanding of the human component of physical security. Therefore, we now turn our attention to outlining a sample of some of these problems and propose lines of research that may be helpful if applied to the field.

Security Guard Turnover

Employee turnover among security officers is, to put it mildly, alarmingly high. It has been estimated that turnover in the field may be as high as 100-300% in some cases (Castro, 2005; Roberts, J.R., 2003; Said, 2002). There is no shortage of authors in the field of physical security who have discussed the problems that this turnover creates (McNally, 2004). However, with few exceptions, proposed solutions to this problem seem to be lacking. Often (e.g. Goodboe, 2002; McNally, 2004) those proposed solutions seem to fall into what could be called the "why can't we all just get along" approach. Essentually, most of the solutions we have seen proposed involve no more than simply treating employees better. And while we have no doubt that treating employees well is important, we doubt that this approach alone will have a universal positive impact on reducing turnover. And such suggestions tend to be fairly amorphous in nature and are therefore can be difficult to implement. However, research on the phenomenon has revealed a number of specific interventions that may be helpful in reducing turnover among security officers (Bitzer, 2005a). Organizations in fields other than physical security have found that the use of employee selection programs such as personality

testing, biodata, and realistic job previews have been helpful in addressing this problem. Therefore, organizations that employ security officers may also benefit from applying these tools. Unfortunately, very little work has been conducted to assess the usefulness of these tools, so their actual impact is difficult to know for certain. As such, systematic evaluations of turnover reduction strategies such as these are badly needed and would be a fruitful area of research

Security Culture and Climate for Security

A more thorough discussion of security culture and climate for security can be found in this issue of the Journal of Physical Security (Bitzer, 2005b), but a brief mention is worthwhile here. Security culture could be defined as organizational manifestations which reflect the importance that an organization places on securing physical, electronic, and information assets. Climate for security, on the other hand, is employees' shared perceptions of what the organization is like in terms of security practices, procedures, routines, and rewards. When combined, both of these concepts work together to elicit appropriate security behaviors from employees. Organizations that value the importance of security and have artifacts (such as policies, procedures, and communication) which reflect these values are positioned to have a strong overall security environment. However, employee perceptions of such a culture will dictate they way they respond. All the security policies in the world are useless unless employees perceive them as appropriate and valuable. If they don't, security policies and procedures will likely be

ignored or circumvented. As such, shared employee perceptions (i.e. organizational climate) that support security are also important.

There has been an increasing interest in the concepts of security culture and climate for security in recent years. The International Atomic Energy Agency (IAEA) (IAEA, 20001; IAEA, 2002; IAEA, 2003; IAEA 2004), Presidents Bush and Putin (White House, 2005), and independent researchers (Khripunov, 2005a; Khripunov, 2005b; Khripunov, Nikonov, & Katsva, 2004) have all stated or eluded to the fact that the establishment of organizational culture and climate that supports security may be helpful to promote appropriate security behaviors among employees. While the concepts of culture and climate have been applied to enhance desired organizational outcomes such as safety (e.g. Zohar, 2000) and innovation (e.g. Stokols, Clitheroe, & Zmuidzinas, 2002), there has been little work attempting to apply these concepts to security. Therefore, there are still a number of untested, and thus unanswered, questions about the application of these concepts to security. Questions about the dimensions that comprise these constructs, the appropriate way to assess the concepts in a security context, and the generalizability of the concepts to a variety of security situations all need to be explored. While some work has begun to address these questions, much work still needs to be done. We strongly encourage others to take up the issue because progress will only be made when a committed and multidisciplinary group of individuals can come together and systematically begin to examine the topic.

Disgruntled Employees

It is a commonly held belief that the insider threat is a major, if not *the* major, concern when considering physical security (Johnston & Bremer-Maerli, 2003). And while there are a number of reasons why an insider may turn against their organization (Shaw, Post & Ruby, 1999), employee disgruntlement is likely high on that list. Indeed, there are a number of anecdotal examples of disgruntled employees who have acted in ways that have harmed their organizations (Shaw, Post & Ruby, 1999).

The problem of employee disgruntlement is serious and needs to be addressed. There is a significant amount of research on programs that attempt to counter employees' feelings of disgruntlement. Interventions such as whistleblowing programs, dispute resolution programs, and the use of ombudsmen all may be helpful. However, the impact of such programs on security is not well known and is worth examination. Sadly, some employees will experience disgruntlement regardless of what the organization does to counter such feelings. Thus, appropriate ways of identifying such employees and dealing with them must also be explored.

Professionalism

Some authors in the field of physical security (e.g., Goodboe, 2002; Somerson, 2005) stress the importance of possessing a professional attitude on developing a strong guard force. Indeed, psychological research outside of the field of physical security has demonstrated that attitudinal professionalism is significantly related to desirable outcomes such as a reduction in turnover intentions and an increase in job performance

(e.g. Bartol, 1979). Unfortunately security officers, unlike their counterparts such as police officers and fire fighters, tend to have a low level of professionalism.

Hall (1968) proposed five components of attitudinal professionalism that include: (1) the use of the professional organization as a major reference; (2) a belief in service to the public; (3) a belief in self-regulation; (4) a sense of calling to the field; and (5) autonomy. These subcomponents of professionalism are ripe for research in relation to security guards. The impacts of these components on security officers, ways to enhance professionalism among security officers, and related topics should all be explored.

Job Characteristics

Certain characteristics of the job that security officers perform present unique problems. While there are a number of such characteristics, we will briefly explore two that are somewhat related, namely boredom and performance appraisal.

We have already briefly mentioned the problem of boredom when discussing issues with video surveillance. However, boredom among security officers is not restricted to this type of task. Indeed, problems associated with boredom among security officers one patrol have been discussed in other research (Charlton & Hertz, 1989). Boredom becomes a problem for security officers because there are often only a limited number of incidents to which guards must respond. As a result, guards often end up sitting around for days, weeks, or months waiting for something to happen. And while this lack of security incidents is a good thing from the perspective of security, the boredom which results can have real negative outcomes. For example Wallace,

Vodanovich, and Restino (2003) found that high boredom proneness is associated making mistakes in accomplishing common tasks. As well, boredom proneness is associated with physical aggression, verbal aggression, anger, and hostility (Rupp & Vodanovich, 1997). Therefore, research on ways to reduce boredom associated with the job of security officers, as well as ways to select employees who are less prone to boredom, would be beneficial.

A related concern that we have about the job of security officers is the efficacy of performance appraisals. A common cliché about performance appraisal is "you get what you measure." If this is in fact the case, and we believe that it is, good performance appraisal is an important aspect of any job. However jobs like that of security officers, which have a low base rate of events, create problems in assessing performance. As a result, it is common to assess the performance of security officers by testing them on their knowledge of policies and procedures (Charlton & Hertz, 1989). While this might be useful for in assessing some aspects of job performance, it does not give a complete picture. Given this, novel ways of assessing the performance of security officers need to be proposed and tested.

Conclusion

Clearly there are a number of issues and concerns in the field of physical security that have yet to be explored in a systematic way. And many of these issues and concerns relate to the human side of the field. While we have identified some of these areas, there are many others which could have been discussed (e.g. security training, management

support for security, etc.). Fortunately, academic disciplines such as psychology and sociology are mature fields which have examined many of these issues in other contexts. We believe that the application of theories and propositions from these, and other, fields can be used to better understand and enhance the field of physical security. Hopefully the discussion above will spark more discussion of these and other concerns and ultimately lead to an increase in research on these topics.

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